

Canadian guidelines for chronic rhinosinusitis

Clinical summary

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Abstract

Objective To provide a clinical summary of the Canadian clinical practice guidelines for chronic rhinosinusitis (CRS) that includes recommendations relevant for family physicians.

Quality of evidence Guideline authors performed a systematic literature search and drafted recommendations. Recommendations received both strength of evidence and strength of recommendation ratings. Input from external content experts was sought, as was endorsement from Canadian medical societies (Association of Medical Microbiology and Infectious Disease Canada, Canadian Society of Allergy and Clinical Immunology, Canadian Society of Otolaryngology—Head and Neck Surgery, Canadian Association of Emergency Physicians, and Family Physicians Airways Group of Canada).

Main message Diagnosis of CRS is based on type and duration of symptoms and an objective finding of inflammation of the nasal mucosa or paranasal sinuses. Chronic rhinosinusitis is categorized based on presence or absence of nasal polyps, and this distinction leads to differences in treatment. Chronic rhinosinusitis with nasal

polyps is treated with intranasal corticosteroids. Antibiotics are recommended when symptoms indicate infection (pain or purulence). For CRS without nasal polyps, intranasal corticosteroids and second-line antibiotics (ie, amoxicillin-clavulanic acid combinations or fluoroquinolones with enhanced Gram-positive activity) are recommended. Saline irrigation, oral steroids, and allergy testing might be appropriate. Failure of response should prompt consideration of alternative diagnoses and referral to an otolaryngologist. Patients undergoing endoscopic sinus surgery require postoperative treatment and follow-up.

Conclusion The Canadian guidelines provide diagnosis and treatment approaches based on the current understanding of the disease and available evidence. Additionally, the guidelines provide the expert opinion of a diverse group of practice and academic experts to help guide clinicians where evidence is sparse.

EDITOR'S KEY POINTS

- Chronic rhinosinusitis (CRS) is an inflammatory disease of the sinuses that has a reported prevalence of 5% in Canada. The condition has a substantial effect on patient quality of life and leads to consumption of substantial health care resources.
- Because of the chronic nature of CRS, patients with this disease should be actively managed and receive regular follow-up. The most recent guidelines, published in 2011, should help busy clinicians stay up to date with current diagnostic and treatment approaches for managing their patients with CRS. This article provides a clinical summary of the guidelines relevant for family physicians.
- Family physicians play a critical role in the management of patients with CRS. Monitoring for acute exacerbations, redirecting therapy when needed, supplying additional referral and testing when appropriate, providing education and support to patients, and interacting with other specialists as part of a clinical care team can help improve the lives of patients with this chronic disease.



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Chronic rhinosinusitis (CRS) is an inflammatory disease of the sinuses that has a reported prevalence of 5% in Canada.¹⁻³ The prevalence increases with age, and is higher for women, individuals with asthma, individuals with chronic obstructive pulmonary disease, and those with a history of allergy.¹ The disease has a substantial effect on patient quality of life, with one study reporting a similar health status between patients with CRS and those with cancer, asthma, or arthritis.³ Another study reported worse social functioning and more bodily pain in patients with CRS versus those with angina, back pain, chronic obstructive pulmonary disease, or congestive heart failure.⁴ Not surprisingly, CRS consumes substantial health care resources. In 2008, 12.5 million office visits were made for CRS in the United States.⁵ A study of 2007 data from the Medical Expenditure Panel Survey estimated the health care cost of CRS in the United States at \$8.6 billion per year.⁶

Although CRS is a disease distinct from acute bacterial rhinosinusitis (ABRS), prescription data from Canada reveal that prescribing habits for antibiotics are comparable between both types of disease.⁷ The recently published Canadian guidelines^{8,9} for diagnosing and treating CRS help shed light on the evolving understanding of CRS and treatment strategies. Because of the chronic nature of CRS, patients with this disease should be actively managed and receive regular follow-up. Use of the new guidelines should help busy clinicians stay up to date with current diagnostic and treatment approaches for managing their patients with CRS.

Quality of evidence

Guideline authors performed a systematic literature search and drafted recommendations. Recommendations received both strength of evidence and strength of recommendation ratings. Input from external content experts was sought, as was endorsement from Canadian medical societies (Association of Medical Microbiology and Infectious Disease Canada, Canadian Society of Allergy and Clinical Immunology, Canadian Society of Otolaryngology—Head and Neck Surgery, Canadian Association of Emergency Physicians, and Family Physicians Airways Group of Canada).

Main message

Pathophysiology. Chronic rhinosinusitis is a complex inflammatory disease that is not well understood. It is proposed that bacteria contribute to persistence

of disease via chronic infection, antibiotic-resistant strains, or the presence of bacterial biofilms. However, the role and contributions of intense inflammation, bacteria, fungi, immunopathologic mechanisms, airway remodeling, susceptibility factors, and environmental contributions remain unclear. Because CRS subtypes present with different pathogenic mechanisms, it has been argued that CRS represents a syndrome of characteristic symptoms rather than a distinct disease.¹⁰

Despite the uncertainty in pathophysiology, it is known that the bacterial landscape in CRS differs from ABRS, with *Staphylococcus aureus*, *Enterobacteriaceae* spp, and *Pseudomonas* spp (especially *Pseudomonas aeruginosa*) predominating rather than *Streptococcus pneumoniae* and *Haemophilus influenzae*, which are the important pathogens in ABRS. However, the role of bacteria in CRS is uncertain given that only about half of patients undergoing surgery for CRS have positive bacterial culture results.¹¹

Diagnosis. The guidelines propose a mnemonic device, CPODS (Congestion or fullness; facial Pain, pressure, or fullness; nasal Obstruction or blockage; purulent anterior or posterior nasal Drainage; and Smell disorder), to assist recall of the important symptoms of CRS (**Figure 1**).^{8,9} Diagnosis of CRS requires the presence of at least 2 important symptoms for at least 8 weeks, plus objective documentation of sinus inflammation with endoscopy or computed tomography (CT).¹²⁻¹⁸ Neither symptoms alone nor objective findings alone are sufficient to make a diagnosis because symptoms are similar to those for upper respiratory tract infections and migraine headaches, and positive imaging results can be found in healthy individuals. Thus, diagnosis requires a thorough physical examination and medical history.

For the physical examination, an otoscope, or headlight and nasal speculum, can provide sufficient illumination to examine the nasal septum, middle meatal area, and inferior turbinates. A systematic evaluation of these areas should be performed (**Box 1**). Sinonasal endoscopy should be performed by an otolaryngologist to confirm suspected CRS. This assessment provides a more thorough inspection of the nasal cavity and sinuses, and permits detection of early-stage polyps. If you believe you need a review on nasal endoscopy, please view the training video on www.sinuscanada.com (the password to enter the site is *sinus*).

Chronic rhinosinusitis can be subcategorized as CRS with nasal polyps (CRSwNP) or CRS without nasal polyps (CRSsNP)¹⁶ (**Figure 1**).^{8,9}

Although both subtypes share similar symptoms, it has been noted that hyposmia is more frequent with CRSwNP, while facial pain, pressure, or fullness is more often associated with CRSsNP.

Box 1. Physical examination: A topical decongestant (eg, oxymetazoline or xylometazoline) can assist with visualization.

Systematically evaluate the nasal septum, middle meatal area, and inferior turbinates

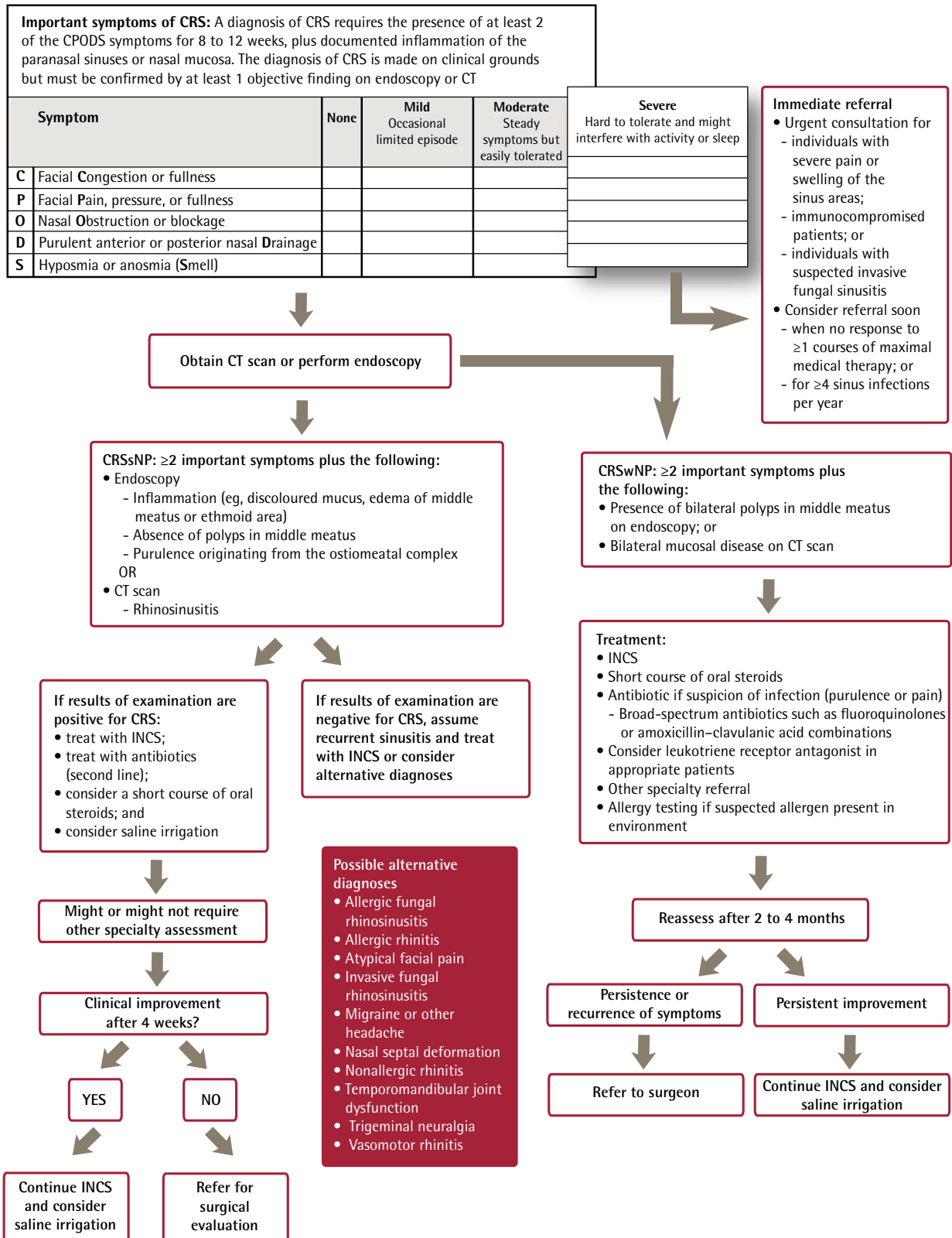
Identify:

- Ulceration, bleeding ulceration, drying crusts, and perforation in nasal septum
- Anatomic obstructions
- Substantial septal deflections
- Unusual presentation of the nasal mucosa
- Unusual colour and condition of the nasal mucosa (healthy is pinkish-orange and moist)
- Dryness or hypersecretion of the nasal mucosa
- Hypertrophy of turbinates
- Presence of nasal masses or secretions

Red flags that indicate referral

- Persistent crusts (consideration of other conditions such as Wegener granulomatosis)
- Irregular surfaces
- Diffusely hemorrhagic areas
- Vascular malformations of ectasias
- Bleeding resulting from minor trauma

Figure 1. Algorithm for the management and treatment of CRS



CRS—chronic rhinosinusitis, CRSsNP—chronic rhinosinusitis without nasal polyps, CRSwNP—chronic rhinosinusitis with nasal polyps, CT—computed tomography, INCS—intranasal corticosteroids.

Adapted from Desrosiers et al.^{8,9}

Role of imaging and other testing: In the case of CRSsNP, endoscopy can be used to document signs of inflammation (eg, edema of the middle meatus, edema of the ethmoid area, or discoloured mucus) and purulence in the ostiomeatal complex needed for a diagnosis. Alternatively, a CT scan can be used to provide evidence of inflammation. When a CT scan is performed, a coronal view is preferred.

In the case of CRSwNP, objective documentation includes the presence of polyps confirmed by endoscopy and the presence of bilateral mucosal disease confirmed by CT.

It should be cautioned that imaging-confirmed inflammation suggestive of CRS is found in up to 42% of asymptomatic individuals.^{19,20} For this reason, objective findings alone are insufficient to make a diagnosis of CRS. Findings must be supported with clinical symptoms.

Imaging is also indicated for CRS that does not respond to maximal medical management. In such cases, a noncontrast coronal CT scan of the sinuses should be ordered. In addition, a detailed CT scan might be ordered by an otolaryngologist who is planning surgical intervention.

Bacterial culture from patients with CRS is unnecessary except in situations of serious complications (eg, intracranial extension, orbital infection) or for patients with nosocomial sinusitis. In these cases, referral to an otolaryngologist is recommended for endoscopic culture of the middle meatus. Results can then be used to help direct treatment. Invasive fungal sinusitis, while rare in healthy populations, can be life-threatening and should be considered in those who are immunocompromised; it requires urgent referral for assessment and treatment.

Alternative diagnoses: For patients whose CRS does not respond to medical therapy, other conditions should be considered, including allergic fungal rhinosinusitis, invasive fungal rhinosinusitis, allergic rhinitis, nonallergic rhinitis, vasomotor rhinitis, nasal septal deformation, atypical facial pain, migraine or headache, temporomandibular joint dysfunction, and trigeminal neuralgia.¹⁷

Treatment. The first step in managing patients with CRS involves identifying and addressing contributing factors (**Box 2**).^{10,21} Allergy is commonly associated with CRS that does not respond to treatment,²² and allergy testing can identify patients whose symptoms might in part respond to allergy treatment. Similarly, in cases of treatment-resistant CRS, testing immune function might reveal dysfunction such as immunoglobulin G deficiency.^{23,24}

The goal of therapy is to reduce symptoms and complications by minimizing inflammation and controlling the infectious components of CRS. Therapy for CRS is based on intranasal corticosteroids (INCSs) with

Box 2. Contributing factors to the development of chronic rhinosinusitis

- Asthma
- Allergic rhinitis
- Cystic fibrosis
- Immune dysfunction
- Ciliary dysfunction
- Lost ostia patency
- Defective mucociliary clearance
- Acetylsalicylic acid–exacerbated respiratory disease

Adapted from Schleimer et al¹⁰ and Van Cauwenberge et al.²¹

or without antibiotics, depending on the presence or absence of symptoms of infection (**Figure 1**).^{8,9} Chronic rhinosinusitis without nasal polyps is often associated with a bacterial infection, thus initial therapy includes both INCSs and antibiotics. Because therapy is typically empiric, antibiotic choice centres on broad-spectrum agents that target enteric Gram-negative organisms, *S aureus*, and anaerobes, as well as the less commonly encountered *S pneumoniae*, *H influenzae*, and *Moraxella catarrhalis*. Thus, fluoroquinolones or amoxicillin-clavulanate acid combinations are recommended for initial treatment of CRSsNP. In addition, a short course of oral steroids should be considered for patients with severe or persistent symptoms.

Initial therapy for CRSwNP is INCSs, with the addition of oral steroids in symptomatic patients. For patients with acetylsalicylic acid sensitivity, trials of leukotriene receptor antagonists might be considered. For patients with CRSwNP and pain, documented purulence, or recurrent episodes of sinusitis, bacterial infection should be suspected and antibiotics initiated (directed either empirically or by culture).

Steroids have also been found to be useful in treating CRS. For patients with severe polypoid disease that was unresponsive to INCS therapy, a 2-week course of prednisone (eg, 30 mg/d for 4 days, then the dose reduced by 5 mg every 2 days for 10 days) reduced polyp size or grade, with INCSs then being used to maintain this improvement.²⁵⁻²⁷ Systemic prednisone (eg, 30 mg/d) given 5 days before and 9 days after endoscopic sinus surgery (ESS) was shown to provide benefit.²⁸ When prescribing oral steroids, the minimally effective dose should always be used to reduce the risk of serious adverse events.²⁹ In addition, it is always necessary to document the discussion with the patient about the risks of systemic steroids to avoid potential litigation down the road.³⁰

Evidence for therapies: Intranasal corticosteroids have been shown to shrink nasal polyps and improve nasal symptoms in patients with CRSwNP.³¹⁻³⁵ In addition to reduced polyp size, studies of mometasone furoate

have reported improvements in nasal congestion and obstruction,³³⁻³⁵ anterior rhinorrhea, postnasal drip, and loss of sense of smell.³³ Similarly, reduced polyp size and improved symptoms have been reported in studies of budesonide versus placebo.^{31,32}

The efficacy of INCSs in treating patients with CRSsNP has been less clear,^{36,37} largely because of small study sizes and limitations of trial designs. Because no long-term adverse effects have been reported with INCS use, they are recommended for the treatment of CRSsNP owing to their anti-inflammatory properties. Their role in treatment might evolve as more rigorous clinical trials shed light on their efficacy in this patient population.

There are no rigorous placebo-controlled studies of antibiotics in the treatment of CRS. The clinical cure and bacteriologic eradication rates were 58.6% versus 51.2% and 88.9% versus 90.5% for ciprofloxacin and amoxicillin-clavulanic acid, respectively,³⁸ and 65% versus 68% and 95% versus 98% for amoxicillin-clavulanic acid and cefuroxime.³⁹ However, sensitivities might have changed since these studies were performed.

Adjunct therapies: Saline irrigation has been shown to improve symptoms in patients with CRS.⁴⁰ Although there are no rigorous data to support the use of mucolytics, antihistamines, or decongestants in CRS, these agents theoretically should help improve symptoms. It should be cautioned that long-term use of topical decongestants should be avoided to prevent exacerbating CRS via development of rhinitis medicamentosa.⁴¹ There is limited evidence that leukotriene modifiers alleviate symptoms in patients with nasal polyps, suggesting they might be considered for some patients when appropriate.^{42,43}

Surgery: Endoscopic sinus surgery is reserved for patients whose CRS does not respond to medical therapy. Endoscopic sinus surgery is used to remove diseased mucosa, relieve obstruction, and restore ventilation. Although the efficacy of ESS over the long term has been debated,⁴⁴ studies report substantial improvement in patient quality of life.⁴⁵⁻⁴⁷ When considering surgery, the risks of lengthy courses of oral steroids and antibiotics should be considered against the risk of substantial complications from ESS, which was recently reported to be 1%.⁴⁸ Another study reported an overall complication rate of 5.8% following ESS, with 0.1% representing substantial complications.⁴⁹

Among the CRS cases that prove difficult to cure using medical management alone, most patients have a combination of pathophysiologic and anatomic factors that support chronic inflammation and bacterial presence.⁵⁰ Referral to an otolaryngologist is necessary to evaluate for possible ESS and to attempt maximal medical therapy (if not already given). If surgery is pursued, proper medical therapy before and after surgery is critical to ensuring success, and should be ordered by the surgeon.

Preoperative and postoperative use of systemic steroids has been shown to result in clinically healthier sinus cavities compared with those of patients not receiving prednisone in the perioperative period.²⁸

Postoperative care for ESS patients varies among surgeons.^{51,52} Use of antibiotics immediately after surgery, saline irrigation, and debridement in the office were relatively consistent post-ESS approaches.⁵¹ Severe pain, fever, or new-onset coloured secretions warrant immediate referral to the operating surgeon. For longer-term management after ESS, saline irrigation is recommended, and INCSs are an option. Intranasal corticosteroids after ESS have shown efficacy in patients with CRS. In one study of patients with allergy and CRS, 85% of those receiving budesonide reported symptom improvement.⁵³ Another study of patients with CRSwNP reported an 89% success rate (ie, with respect to risk of failure) 5 years after ESS.⁵⁴ However, other studies reported similar rates of polyp recurrence at 1 year with or without INCS use.⁵⁵ In another study, time to relapse (defined as a 1-point increase on a polyp scoring system scale of 0 to 6 points) was longer for patients receiving INCS versus placebo after ESS (175 days vs 125 days, $P=.049$).⁵⁶

Role of the family physician. Family physicians play a critical role in the management of patients with CRS. Monitoring for acute exacerbations of CRS, redirecting therapy when needed, supplying additional specialist referral and testing when appropriate, providing education and support to patients, and interacting with other specialists as part of a clinical care team can help improve the lives of patients with this chronic disease.

Patients with CRS should be advised to avoid allergic triggers, environments where exposure to infective agents is likely (eg, day cares, health care centres), smoking, and acute exacerbations. Clinicians should closely monitor their patients with asthma, mucosal eosinophilic leukocyte CRS, or with high peripheral eosinophilic leukocyte counts, as they are at risk of recurrence.⁵⁷ Referral to an otolaryngologist should be made to confirm a diagnosis, to obtain endoscopic culture to direct medical therapy, and to address and prevent complications (**Box 3**).

Conclusion

Chronic rhinosinusitis is a challenging disease to manage owing to our incomplete knowledge about the many interacting factors that contribute to its development and persistence. Additionally, rigorous clinical trials that assess efficacy and safety of therapies in different CRS types are lacking. Despite these challenges, family physicians play a pivotal role in helping their patients with CRS proactively manage the disease and acute exacerbations. The Canadian

Box 3. Indications for referral: Evidence is grade D (based on expert consensus) and recommendations are strong.

Urgent referral

- Severe symptoms of pain or swelling of the sinuses
- Immunocompromised patients
- Suspected invasive fungal sinusitis

Referral

- Failure of maximal medical therapy (allergen avoidance measures, topical steroids, nasal irrigation, systemic antibiotics)
- Having 4 or more sinus infections per year

guidelines for CRS offer up-to-date guidance to assist clinicians with the diagnostic process and recommendations for treatment.

Dr Kaplan is a family physician practising in Richmond Hill, Ont, a staff physician at Brampton Civic Hospital, and Chair of both the Family Physician Airways Group of Canada and the Respiratory Medicine Program Committee of the College of Family Physicians of Canada.

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Competing interests

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